



ANNOTATED COPY SUBSTITUTE CLAIMS

Claim 13 (New). An improved jar tool for delivering tools, including electronic packages, into wellbores and for retrieving tools stuck in the wellbores, comprising:

said jar tool includes upper and lower spaced housings having confronting spaced ends coupled together by a lost motion coupling for limited movement of the housings toward and away from one another along a common axis, and opposed ends opposed to one another and to the lost motion coupling; a closure member forming attachment means at each opposed end of the upper and the lower housings, respectively, for supporting and running the jar tool into and out of a wellbore and for attaching tools thereto; and, confronting closure members at the confronting ends of the housings;

a shaft having opposed ends reciprocatingly received respective the upper housing; said upper housing having axially aligned annular stored energy chambers formed respective said shaft and said upper housing; biasing means supported within each annular stored energy chambers, including springs having different spring characteristics;

transfer members extending from said shaft for engaging and compressing said biasing means to thereby store energy there-within responsive to relative movement of said shaft respective said upper housing;

a releasable latch means interconnecting the shaft and lost motion coupling and for releasing the shaft respective the lost motion coupling upon demand after storing energy within the biasing means, to thereby ~~enabling acceleration of~~ accelerate the upper housing ~~away from~~ respective the lower housing;

a hammer and anvil, respectively, positioned within the upper housing on a confronting closure member and on the lost motion coupling, respectively;

an axial passageway formed through said upper housing,
5 ~~and continues~~ on through the lost motion coupling and into the lower housing, a protective tubing having ends with one end affixed respective the upper housing and ~~the other~~ another end terminating within a chamber formed ~~in~~ within the lower housing; said tubing is slidably received within the passageway, an electrical conductor
10 extending through the tubing and having an end adapted to be connected to ~~a conductor extending~~ transmit signals uphole from the upper housing, ~~and the~~ another end being received within the ~~chamber formed within the~~ lower housing ~~where the conductor~~ is provided with a surplus length to provide for the length of the stroke
15 occasioned by reciprocation of the upper housing respective the lower housing, the last said end of the conductor ~~terminating in a connector~~ is adapted to be connected to apparatus supported respective said lower housing.

Claim 14 (New). The jar tool of Claim 13 wherein a wireline supports a sinker bar which is supportingly attached to the upper
20 housing for running the jar tool into and out of the wellbore, and for moving the latch member from a latched into an unlatched position; and vice versa;

said protective tubing extends through the shaft, through
25 the releasable coupling, hammer, anvil and lost motion coupling, where the lower terminal end of the tubing opens into ~~the~~ a chamber ~~formed in~~ of the lower housing where the conductor is provided with sufficient length to provide for the take up required by the length of the stroke occasioned by reciprocation of the main

upper housing respective the lower main housing, the ~~other~~ another
end of the conductor is adapted to be connected to apparatus sup-
ported respective said lower chamber to thereby enable electronic
data to be transmitted from the lower end of the jar tool axially
5 through the jar tool, and along the wireline to the surface.

Claim 15 (New). An improved jar tool for use in wellbores and for
retrieving stuck objects from a wellbore, comprising:

upper and lower housings having confronting ends coupled
together by a lost motion coupling for limited movement toward and
10 away from one another along a common axis; and opposed ends opposed
to one another and to said lost motion coupling; attachment means
connected at each opposed end of the upper and the lower housings
for supporting and running the tool into and out of the wellbore
and for attaching an apparatus including a tool to the lower end of
15 the lower housing;

a shaft having opposed ends reciprocatingly received
within said upper housing; said upper housing having a plurality of
annular stored energy chambers formed therein between said shaft
and said upper housing; biasing means, including springs having
20 different spring characteristics are supported within the stored
energy chambers and arranged concentrically respective said shaft;

said shaft having an outwardly extending member thereon
connected to engage said biasing means for storing energy therein
in response to relative movement of said upper housing respective
25 said lower housing;

releasable latch means interconnecting one end of the
shaft respective one end of the lost motion coupling for releasing
energy stored within said biasing means upon demand; a hammer

Claim 17 (New). An improved jar tool for use in wellbores and for retrieving stuck objects from a wellbore, comprising:

said jar tool having axially aligned upper and lower housings having confronting ends and opposed ends; said housings being coupled together by a lost motion coupling arranged therebetween for limited movement of the housings toward and away from one another along a common axis;

a shaft having opposed ends and reciprocatingly received within said upper housing, and a plurality of annular stored energy chambers formed therein between said shaft and said housing; biasing means, including springs having different spring characteristics, are supported within said annular stored energy chambers and arranged concentrically respective said shaft;

a closure means connected at each opposed end of the upper and the lower housings for supporting and running the tool into and out of the wellbore and for attaching an apparatus including a tool to the lower end of said lower housing; said lost motion coupling having one end attached to the confronting closure means of the lower housing, with the opposed end slidably extending through the confronting closure means of the upper housing where the lost motion coupling is attached to the shaft by a releasable latch means;

said shaft having an outwardly extending member thereon connected to engage said biasing means for storing energy therein in response to relative movement of said upper housing respective said lower housing;

a hammer formed on an interior face of the confronting closure means of the upper housing; an anvil affixed to and underlying the releasable latch means and confronting the hammer;

whereby; when the jar tool is in the latched configura-

having opposed ends and forming a closure for said lower end of
said upper chamber; an anvil affixed to and underlying the releas-
able latch means and confronting said hammer; said lost motion
coupling interconnecting the upper and lower housings to be moved
5 along a common axis toward and away from one another, and extends
from the releasable latch means;

one end of the lost motion coupling terminates within
said upper chamber while the other end is affixed to said lower
housing; the anvil ~~is~~ being positioned to transmit a jarring
10 action through the lost motion coupling into the lower housing when
said hammer impacts thereagainst;

said lower housing has a chamber formed therein; a piston
slidably received within the chamber dividing the chamber into
first and second chambers, said protective tubing extends through
15 said first chamber, said piston, and into said second chamber where
the conductor emerges from the tubing and is provided with a
greater length than the length of the stroke of the lost motion
coupling.

Claim 16 (New). The improvement of Claim 15 wherein the jar tool
20 is run into a borehole supported by a wireline, said releasable
latch means interconnects the shaft respective the lost motion
coupling apparatus for releasing the lower end of the shaft from
the lost motion coupling upon increase in the wireline tension;

~~a~~ the hammer being formed on an inner face of the
25 confronting closure member and ~~an~~ the anvil being connected to
the shaft for abutting engagement of the hammer against the anvil
when said latch means is unlatched.

tion and subjected to an increased uphole force, the releasable latch means separates, releasing the shaft of the upper housing, whereupon the upper housing accelerates axially away from said lower housing and is arrested by said hammer abuttingly engaging said anvil, thereby providing a jar action for a tool string.

Claim 18 (New). The jar tool of Claim 17 wherein there is an axial passageway formed through said shaft, through said latch means, anvil, lost motion coupling and into a chamber formed in said lower chamber;

an electrical conductor within the passageway having opposed ends, one end adapted to be connected to a conductor extending uphole to the surface, the other end extending through the axial passageway into a chamber formed in the lower chamber where a conductor length is stored which is a greater length than the length of the stroke of the lost motion coupling.

Claim 19 (New). The jar tool of Claim 17 wherein there is an axial passageway formed through said upper housing, including extending through the shaft, releasable latch means, anvil, hammer, lost motion coupling, and opens into a chamber formed within the lower housing; a protective tubing attached respective the upper housing and slidably received within the passageway;

an electrical conductor supported within the protective tubing and having opposed ends, one conductor end adapted to be connected to a conductor extending uphole toward the surface, the other end extending into a chamber formed within the lower housing, said housing being divided into chambers by a movable wall through which the end of the tubing extends, and where the conductor is stored in a loose or serpentine configuration where the terminal

end can be connected to an apparatus supported by the lower housing.

Claim 20 (New). Method for electronically communicating between an uphole apparatus and a downhole jar tool apparatus that forms part of a tool string located downhole within a wellbore, and, wherein the jar tool is useful for retrieving stuck objects from a wellbore; said jar tool includes opposed axially aligned upper and lower housings having confronting ends coupled together by a lost motion coupling having ends with one end thereof affixed to the lower housing and the other end extending into the upper housing where it is releasably connected to a shaft by a releasable latch apparatus interposed between the shaft and the lost motion coupling for limited movement of the housings toward and away from one another along a common axis; and, the housings having opposed ends opposed to one another and to said lost motion coupling, with there being attachment means at each opposed end of the upper and the lower ~~main~~ housings for supporting and running the tool into and out of a borehole and for attaching an apparatus, including a tool, to the lower end thereof;

there being axially aligned annular stored energy chambers formed within said upper main housing; and, biasing means, including springs, within each stored energy annular chamber arranged concentrically respective the shaft ~~which~~ and is connected to the shaft in a manner to store energy within said biasing means responsive to relative movement between said upper and lower housings; comprising the steps of:

step 1. configuring the shaft to engage the biasing means to compress the biasing means and thereby store energy therein responsive to downward movement of said upper housing

respective the lower housing;

step 2: forming a hammer and anvil, respectively, within a chamber formed in the upper ~~chamber~~ housing with the hammer being formed on the interior face of the confronting closure member and the anvil being formed on the lost motion coupling in underlying relationship respective the releasible latch means;

step 3: forming an axial passageway extending from the upper closure member of the upper housing, ~~and~~ through the shaft, biasing means, releasible latch means, anvil, hammer, lost motion coupling, and into a chamber formed within the lower housing;

step 4. ~~placing a~~ supporting the hammer ~~on a~~ respective the closure member ~~for closing~~ located at the lower end of said upper ~~main~~ chamber, and extending the hammer ~~into said upper main chamber concurrently with applying the closure member to the lower end of the upper chamber,~~ into abutting engagement respective the anvil responsive to release of the stored energy;

step ~~7~~ 5. mounting ~~an~~ the anvil respective said main shaft for decelerating the hammer in response to release of energy from said biasing means;

step ~~8~~ 6. forming an axial passageway extending through ~~said~~ the shaft, ~~that extends through said~~ the latch means, anvil, hammer, lost motion coupling, and into ~~the~~ communication with a chamber of the lower housing; and extending a conductor through the passageway with the conductor having ends, one end adapted to be connected to a tool attached at the lower end of the lower housing wherein ~~the last said~~ one conductor end is provided with a surplus length to provide for the length of the stroke occasioned by the reciprocation of the upper housing respective the lower housing.

Claim 21 (New). The method of claim 20 and further including the step of protecting the conductor by the provision of a protective tubing through which the conductor extends, wherein the tubing is slidably received within the passageway with one end of the tubing being affixed to the upper housing closure member and the other end of the tubing opening into the chamber of the lower housing.

Claim 22 (New). The method of Claim 20, and further including the step of protecting the conductor by the provision of a protective tubing through which the conductor extends; a piston slidably received within the chamber of the lower housing dividing the chamber into first and second chambers, said protective tubing extends through said first chamber, said piston, and into said second chamber where the conductor emerges from the tubing and is provided with a greater length than the length of the stroke of the lost motion coupling.

end of claims.